

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平9-133607

(43) 公開日 平成9年(1997)5月20日

(51) Int.Cl.⁸

G 0 1 M 11/00

識別記号

庁内整理番号

F I

G 0 1 M 11/00

技術表示箇所

R

審査請求 未請求 請求項の数1 F D (全 8 頁)

(21) 出願番号 特願平7-315967

(22) 出願日 平成7年(1995)11月9日

(71) 出願人 000005290

古河電気工業株式会社

東京都千代田区丸の内2丁目6番1号

(71) 出願人 000004226

日本電信電話株式会社

東京都新宿区西新宿三丁目19番2号

(72) 発明者 楢岡 清一

東京都千代田区丸の内2丁目6番1号 古

河電気工業株式会社内

(72) 発明者 黒岩 真人

東京都新宿区西新宿三丁目19番2号 日本

電信電話株式会社内

(74) 代理人 弁理士 五十嵐 清

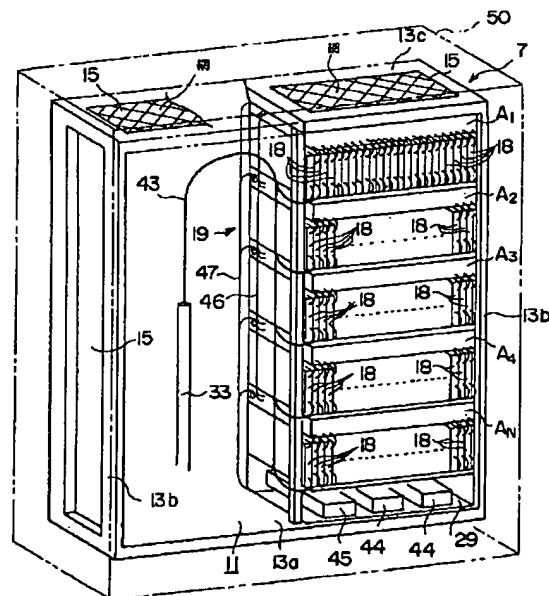
最終頁に続く

(54) 【発明の名称】 光線路の監視切り換え装置

(57) 【要約】

【課題】 UV樹脂被覆心線を用いた光線路の監視切り換え装置において、UV樹脂被覆心線の紫外線による劣化を防止する。

【解決手段】 架台11にファイバ切り換え選択装置A₁～A_nと光ファイバカプラモジュール18を設置し、加入者系の光ケーブル33の各心の光線路43を光ファイバカプラモジュール18に結合し、各光ファイバカプラモジュール18はファイバ切り換え選択装置A₁～A_nの受け側光ファイバに接続する。ファイバ切り換え選択装置A₁～A_nには光スイッチを設け、測定したい光線路に通じる受け側光ファイバを選択的に切り換えて、光線路からの検出光を試験制御部側へ送り、OTDR等による測定を行う。光ケーブル33の各光線路43と、光ファイバカプラモジュール18の光心線と、光スイッチ側の受け側光ファイバの心線は共にUV樹脂被覆心線を用い、装置全体を紫外線遮断ケース50で覆い、UV樹脂被覆心線の紫外線による劣化を防止する。



PAT-NO: JP409133607A

DOCUMENT-IDENTIFIER: JP 09133607 A

TITLE: MONITORING CHANGEOVER APPARATUS FOR BEAM-OF-LIGHT LINE

PUBN-DATE: May 20, 1997

INVENTOR-INFORMATION:

NAME

NARAOKA, SEIICHI

KUROIWA, MASATO

NAKAO, NAOKI

EBIHARA, TAKASHI

ASSIGNEE-INFORMATION:

NAME

COUNTRY

FURUKAWA ELECTRIC CO LTD:THE

N/A

NIPPON TELEGR & TELEPH CORP <NTT>

N/A

APPL-NO: JP07315967

APPL-DATE: November 9, 1995

INT-CL (IPC): G01M011/00

ABSTRACT:

PROBLEM TO BE SOLVED: To prevent a UV resin-coated wire from being degraded due to ultrasonic rays in the monitoring changeover apparatus of a beam-of-light line which uses the UV resin-coated wire.

SOLUTION: Fiber changeover selection devices A<SB>1</SB> to AN and optical-fiber coupler modules 18 are installed at a frame 11, beam-of-light

lines 43 at respective cores of subscriber-based optical cables 33 are coupled to the optical-fiber coupler modules 18, and the respective optical-fiber coupler modules 18 are connected to receiver-side optical fibers at the fiber changeover selection devices A<SB>1</SB> to AN. Optical switches are installed

at the fiber changeover selection devices A<SB>1</SB> to AN, the receiver-side

optical fibers which communicate with beam-of-light lines to be measured are changed over selectively, and beams of detection light from the beam-of-light lines are sent to the side of a test and control part so as to be measured by a pulse tester, an OTDR or the like. The respective beam-of-light lines 43 at the optical cables 33, optical core wires at the optical-fiber coupler modules 18 and core wires at the receiver-side optical fibers on the side of the optical switches use UV resin-coated core wires, and an apparatus is covered with a UV-cutoff case 50 as a whole so as to prevent the UV resin-coated wires from being degraded due to ultraviolet rays.

COPYRIGHT: (C)1997,JPO

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 09-133607

(43)Date of publication of application : 20.05.1997

(51)Int.Cl.

G01M 11/00

(21)Application number : 07-315967

(71)Applicant : FURUKAWA ELECTRIC CO LTD:THE
NIPPON TELEGR & TELEPH CORP <NTT>

(22)Date of filing : 09.11.1995

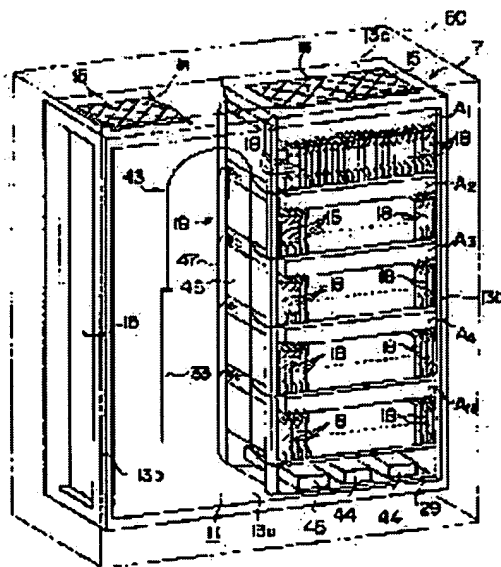
(72)Inventor : NARAOKA SEIICHI
KUROIWA MASATO
NAKAO NAOKI
EBIHARA TAKASHI

(54) MONITORING CHANGEOVER APPARATUS FOR BEAM-OF-LIGHT LINE

(57)Abstract:

PROBLEM TO BE SOLVED: To prevent a UV resin-coated wire from being degraded due to ultrasonic rays in the monitoring changeover apparatus of a beam-of-light line which uses the UV resin-coated wire.

SOLUTION: Fiber changeover selection devices A1 to AN and optical-fiber coupler modules 18 are installed at a frame 11, beam-of-light lines 43 at respective cores of subscriber-based optical cables 33 are coupled to the optical-fiber coupler modules 18, and the respective optical-fiber coupler modules 18 are connected to receiver-side optical fibers at the fiber changeover selection devices A1 to AN. Optical switches are installed at the fiber changeover selection devices A1 to AN, the receiver-side optical fibers which communicate with beam-of-light lines to be measured are changed over selectively, and beams of detection light from the beam-of-light lines are sent to the side of a test and control part so as to be measured by a pulse tester, an OTDR or the like. The respective beam-of-light lines 43 at the optical cables 33, optical core wires at the optical-fiber coupler modules 18 and core wires at the receiver-side optical fibers on the side of the optical switches use UV resin-coated core wires, and an apparatus is covered with a UV-cutoff case 50 as a whole so as to prevent the UV resin-coated wires from being degraded due to ultraviolet rays.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the
examiner's decision of rejection or application
converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of
rejection]

[Date of requesting appeal against examiner's decision
of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

Disclaimer:

This English translation is produced by machine translation and may contain errors. The JPO, the NCIP, and those who drafted this document in the original language are not responsible for the result of the translation.

Notes:

1. Untranslatable words are replaced with asterisks (****).
2. Texts in the figures are not translated and shown as it is.

Translated: 23:13:01 JST 03/27/2006

Dictionary: Last updated 03/24/2006 / Priority:

FULL CONTENTS

[Claim(s)]

[Claim 1] It is formed by one or more fiber change selection equipment equipped with the optical switch, and The fixed arrangement group of the receptacle side optical fiber of plurality [switch / said / optical], It has a master optical fiber by the side of movement which switches to the receptacle side optical fiber of this fiber arrangement group alternatively, and is connected to it. Said receptacle side optical fiber is connected to the monitor side optical fiber which carries out optical combination on the light way of each heart of an optical cable, and [said master optical fiber] It is surveillance change equipment of a light way connected to the test control part which measures detection light taken in from the output and light way of switch change instructions to an optical switch through an optical switch. UV resin covering cable core with which the light way of each heart of said receptacle side optical fiber, the monitor side optical fiber, and an optical cable made ultraviolet curing resin the covering outer layer is used. It is surveillance change equipment of the light way characterized by covering the exposure wiring field of UV resin covering cable core including said fiber change selection equipment, the monitor side optical fiber, and a light way in the case for ultraviolet-rays interception.

[Detailed Description of the Invention]**[0001]**

[Field of the Invention] This invention relates to the surveillance change equipment of the light way used for the light way maintenance system for performing the maintenance, when the light way which performs optical communications is supervised and abnormalities arise.

[0002]

[Description of the Prior Art] The light way maintenance system for performing maintenance control of the light way (optical fiber) of the optical cable constructed at the member side from the office side which performs optical communications is introduced. The conventional common light way maintenance system is shown in

drawing 4 R> 4. This system is the test control part 1 and two or more fiber change selection equipment A1 -An (s). It has two or more optical branched type fiber coupler modules 18, and is constituted. The light sources 3, such as a semiconductor laser with which the test control part 1 generates examination light, and a light emitting diode, It has two or more measuring instruments containing the optical power meter 2 and the pulse test machine (OTDR (Optical Time Domain Reflectometer)) 4, a personal computer 5, the optical switch 6, and a power supply unit. Although the optical power meter 2, a light source 3, OTDR4, and a personal computer 5 are drawn on the outside of the test control part 1 in drawing 4, this is such a thing on account of explanation, and these are accommodated in the case of the test control part 1 in fact.

[0003] Signal connection is made at the workstation (not shown) and the personal computer 5 is generalized by workstation. The program which performs the self-check of a light way maintenance system in a personal computer 5, Build in various kinds of measurement programs using the measuring instrument of the OTDR4 grade, choose the measuring instrument to be used according to the kind of measurement using the light of the light source 3, and The optical power meter 2, a light source 3, the optical fiber 8a by the side of OTDR4, 8b, and 8c, Fiber change selection equipment A1 -An The connection change by the near master optical fiber 12 and the optical switch 6 of 14 is controlled. moreover, the personal computer 5 -- each -- fiber change selection equipment A1 -An Directions and a command of a fiber change are outputted.

[0004] each -- fiber change selection equipment A1 -An It has the optical switch (change switch mechanism of an optical fiber). namely, -- each -- fiber change selection equipment A1 -An **** -- arrangement arrangement is carried out and two or more receptacle side optical fibers 10 are being fixed. And the master optical fiber 12 by the side of movement and 14 are fixed to the side which counters the arrangement group of these receptacle side optical fiber 10 by the move stage (not shown). According to the instructions added from the personal computer 5 of said test control part 1, movement of the direction of three dimensions of a move stage is performed, and change connection of the master optical fiber 12, 14, and the receptacle side optical fiber 10 is made.

[0005] Two or more are summarized, and the arrangement set of said receptacle side optical fiber 10 is carried out at the connection connector 16, and [the example of drawing 4] The receptacle side [8] optical fibers 10 from No.1 to No.8 are collected by one connection connector 16. So that it may say that the receptacle side [8] optical fibers 10 from No.9 to No.16 are collected by other one connection connector 16 Every two or more receptacle side optical fibers 10 are collected by one connection connector 16. Several 100 The receptacle side optical fiber 10 of the heart is one piece of fiber change selection equipment A1. It is equipped. Other several 100 One piece of fiber change selection equipment A2 of others [optical fiber / 10 / of the heart / receptacle side] Each receptacle side optical fiber 10 equips the connection end with a connector 16, and arrangement arrangement is carried out so that it may say that it is equipped.

[0006] Optical combination of the optical branched type fiber coupler 17 is carried out on the light way of each heart of an optical cable with the light way (optical fiber) of the several 1000 hearts. The optical fiber coupler 17 is built into the optical fiber coupler module 18. The input end of the input side optical fiber 20 of the optical fiber coupler module 18 is collected by the coupler side input connector 21, and the outgoing end of the output

side optical fiber 22 of the optical fiber coupler 17 is similarly collected by the coupler side output connector 23. In the example of drawing 4, eight output side optical fibers 22 from No.1 to No.8 are collected by the coupler side [one piece] output connector 23, and the input side [8] optical fibers 20 from No.9 to No.16 are collected by the coupler side [one piece] input connector 21. Optical combination of the examination light supplied from the input side optical fiber 20 of No.9 to No.16 is carried out, respectively with the light way where it corresponds from No.1 to No.8 by optical fiber coupler combination to which No.1 to No.8 correspond. The return light of the examination light supplied to the optical fiber coupler 17 is returned through the output side optical fiber 22 to which No.1 to No.8 correspond, respectively from the input side optical fibers 20 from No.9 to No.16.

[0007] In drawing 4, the light ways (light way of an optical cable) from No.1 to No.8 carry out optical combination with each optical fiber coupler 17 of the optical fiber coupler module of No.1. So that it may say that the light ways (not shown) from No.9 to No.16 carry out optical combination with each optical fiber coupler of the optical fiber coupler module of No.2 Each optical fiber coupler 17 with which two or more one optical fiber coupler modules 18 correspond for every light (example of drawing 4 8 hearts) way of the heart is carrying out optical combination. In addition, the light way of each heart of the optical fiber coupler module 18 and an optical cable is connected by combination of Connector 24a and 24b.

[0008] In this kind of light way maintenance system, the optical fiber 8b of a light source 3 is connected to the master optical fiber 12 by the optical switch 6, for example. The optical fiber 8a of the optical power meter 2 is connected to the master optical fiber 14, and it is fiber change selection equipment A1. [a side] [that the master optical fiber 12 is connected to the line of No.9 of the receptacle side optical fiber 10, and the master optical fiber 14 is connected to the line of No.1 of the receptacle side optical fiber 10] The examination light from a light source 3 carries out coupler combination with the light way of No.1 of an optical cable through the optical fiber 8b, the master optical fiber 12, and the input side optical fiber 20 of No.9. The return light of examination light results in the optical power meter 2 through the output side optical fiber 22 of No.1, the master optical fiber 14, and the optical fiber 8a, it returns with the optical power meter 2, the optical power of examination light is measured, and the self-check of whether there are any abnormalities in a light way maintenance system is conducted. This self-check is conducted by the route which passes along all the optical fiber couplers.

[0009] And after checking that there are no abnormalities in all the routes, injury point (unusual point) detection of a light way using OTDR4 grade, optical loss measurement from OTDR one side, etc. are performed. By performing the change of OTDR4 and the optical power meter 2, and connecting to the master optical fiber 14 the optical fiber 8c which leads to OTDR4 on the occasion of the measurement using this OTDR4, it is in the state of drawing 4 and measurement by OTDR4 of the light way of No.1 is performed. Fiber change selection equipment A1 after measurement of this light way of No.1 is completed [a side] Measurement of the light way of No.2 is performed by connecting the master optical fiber 14 to the receptacle side optical fiber 10 (not shown) of No.2 connected to the output side optical fiber of the optical fiber coupler (not shown) of No.2 by which optical combination is carried out on the light way (not shown) of No.2. Thus, by the fiber change

selection equipment side [the master optical fiber 12 and 14] By switching and connecting with the receptacle side optical fiber 10 by the side of the input side optical fiber 20 of the optical fiber coupler which is carrying out optical combination, and the output side optical fiber 22 on a corresponding light way, various kinds of measurement of each light way of an optical cable is performed one by one.

[0010] by the way -- each -- fiber change selection equipment A1 -An carrying out optical combination on each light way of an optical cable -- said -- each -- fiber change selection equipment A1 -An [each optical fiber coupler module 18 connected to the receptacle side optical fiber 10] The surveillance change equipment 7 of the light way of a light way maintenance system is constituted, and as shown in drawing 6 , unit formation of the surveillance change equipment 7 of this light way is carried out. In drawing 6 , a mount 11 is with Bottom 13a, its both-sides side 13b, and the upper surface 13c, it is formed in the shape of [which made order both sides the opening side] a frame, the opening window part 15 is formed in the right-and-left both-sides side 13b and upper surface 13c, and the net for fall prevention of a thing etc. is stretched by the opening window part 15 of the upper surface 13c. As for the right-and-left one side of a mount 11, in the figure, the shelf 19 is formed in right-hand side. As for this shelf 19, two or more steps of accommodation parts are prepared in the up-and-down direction, and the equipment installation part and the modular installation part are prepared in the accommodation part of each stage of the bottom space part 29 top. It is fiber change selection equipment A1 - An to each equipment installation part. It is installed and row arrangement of two or more optical fiber coupler modules 18 is carried out at the modular installation part of the bottom.

[0011] The optical cable (although one optical cable is indicated by a diagram, many optical cables are accommodated in the grade which can hardly do a crevice in fact) 33 of a large number constructed at the member side is accommodated in the space part on the left-hand side of a mount 11. The light way 43 of each heart of this optical cable 33 serves as a tape cable core, and each light way is connected to the corresponding optical fiber coupler module 18. And each optical fiber coupler module 18 and corresponding fiber change selection equipment A1 -An Connection with the receptacle side optical fiber is attained, and the circuit of surveillance change equipment 7 is formed. in addition, the control part 44 prepared in the bottom space part 29 of the shelf 19 -- fiber change selection equipment A1 -An controlling an optical switch change -- the communications department 45 -- each -- fiber change selection equipment A1 -An Communication between the test control parts 1 is performed. In addition, 46 are the master optical fiber 12 and an optical code cable core which connects 14 to the test control part 1 side among drawing 6 , and 47 is a control cable which connects the communications department 45 and the test control part 1.

[0012]

[Problem to be solved by the invention] As described above, it is fiber change selection equipment A1 -An [equipment / 7 / of a light way / surveillance change] of plurality [mount / 11]. With many optical fiber coupler modules 18, since two or more optical cables 33 are accommodated, the wiring number of the optical fiber between each [these] interconnection turns into a huge number. The optical code cable core was once used from the point that these optical fibers secure mechanical intensity. However, the structure which an optical code cable core prepares an enveloping layer in the outside of a nakedness optical fiber, arranges a

reinforcement fiber on the outside of the enveloping layer further, and is further covered with an outer cover sheath on the outside of the reinforcement fiber sake, The volume per optical fiber becomes large, there is a problem that packaging density of an optical fiber cannot be raised, and, these days, what used each of these optical fibers as the tape cable core is adopted from a viewpoint which avoids such a problem. Although a tape cable core makes two or more optical fibers arrange in parallel and is manufactured by run taking over ***** through a covering part, in order to raise the manufacture speed of this tape cable core, these days, ultraviolet curing resin (UV resin) is widely adopted as an enveloping layer of an optical fiber. Since hardening speed is quick, UV resin can raise the running speed of the optical fiber of UV resin covering work, and it can fully raise manufacturing efficiency by this.

[0013] this invention person was doing the characteristic test of UV resin covering cable core under various kinds of environmental conditions, and when the covering cable core of UV resin was exposed into ultraviolet-rays atmosphere from the test result for a long period of time, he came to trace that the bad influence of degradation arises in UV resin enveloping layer. Although UV resin is hardened in response to ultraviolet rays, if it continues receiving ultraviolet rays succeedingly even after hardening, it will be thought that degradation arises, when the chemical reaction of the hardening continues advancing and the hardening reaction advances too much. Since the wiring part of UV resin covering cable core of conventional surveillance change equipment 7 is in the exposure state and it is in the state where it was exposed to Lighting Sub-Division and other ultraviolet rays, as it is discharged from indoor Lighting Sub-Division etc. and ultraviolet rays are shown in drawing 6 By long-term use of equipment, degradation of UV resin advances, there is a problem that damage to an optical fiber cable core arises, and it becomes a problem on the reliability of long-term use.

[0014] It is made in order that this invention may solve the above-mentioned technical problem, and the purpose is to prevent degradation by ultraviolet rays, to continue at a long period of time, and to offer the surveillance change equipment of a reliable light way, even if UV resin covering cable core is used for the optical fiber.

[0015]

[Means for solving problem] This invention has provided the following means, in order to attain the above-mentioned purpose. This invention is prepared by one or more fiber change selection equipment equipped with the optical switch, and Namely, the fixed arrangement group of the receptacle side optical fiber of plurality [switch / said / optical], It has a master optical fiber by the side of movement which switches to the receptacle side optical fiber of this fiber arrangement group alternatively, and is connected to it. Said receptacle side optical fiber is connected to the monitor side optical fiber which carries out optical combination on the light way of each heart of an optical cable, and [said master optical fiber] It is surveillance change equipment of a light way connected to the test control part which measures detection light taken in from the output and light way of switch change instructions to an optical switch through an optical switch. UV resin covering cable core with which the light way of each heart of said receptacle side optical fiber, the monitor side optical fiber, and an optical cable made ultraviolet curing resin the covering outer layer is used. The exposure wiring field of UV resin covering cable core including said fiber change selection equipment, the monitor side optical fiber, and a light

way is made into a means to solve a technical problem with the composition covered in the case for ultraviolet-rays interception.

[0016] Even if UV resin covering cable core which made ultraviolet curing resin the covering outer layer is used for the light way of the receptacle side optical fiber of fiber change selection equipment, the monitor side optical fiber, and each heart of an optical cable in this invention of the above-mentioned composition [the exposure wiring field of these UV resin covering cable cores] By being covered in the case for ultraviolet-rays interception, ultraviolet rays do not hit UV resin covering cable core, and it becomes possible for degradation of UV resin covering cable core by ultraviolet rays to occur [stop / *****], and to secure the reliability over the long period of time of UV resin covering cable core by this.

[0017]

[Mode for carrying out the invention] The example of an embodiment of this invention is hereafter explained based on Drawings. The example of 1 embodiment of the surveillance change equipment of the light way concerning this invention is shown in drawing 1 . Using a mount 11, unit-ize and the surveillance change equipment of this example of an embodiment is formed, as the portion of the surveillance change equipment 7 of the system shown in said drawing 4 is shown in said drawing 6 . This unit-sized whole surveillance change equipment 7 is covered in the ultraviolet-rays interception case 50, and it is characterized by preventing invasion of the ultraviolet rays to surveillance change equipment 7.

[0018] The material of the ultraviolet-rays interception case 50 will not be limited especially if it has the character which can intercept ultraviolet rays, but it forms the ultraviolet-rays interception case 50 in this example of an embodiment using metal plates, such as iron, from the ease of case processing etc.

[0019] the composition of the mount portion of the surveillance change equipment 7 of this example of an embodiment is the same as that of what is shown in drawing 6 of the conventional example -- a mount 11 -- fiber change selection equipment A1 -An Equip the optical fiber coupler module 18, two or more optical cables 33, and the control part 44 and the communications department 45, have used the light way of each heart of the optical cable 33 as the tape cable core of UV resin covering, and The receptacle side optical fiber 10 (drawing 4), Both the cable cores of the optical fiber coupler module 18 that function as a monitor side optical fiber combined with each light way are using the cable core of UV resin covering.

[0020] Since the surveillance change equipment 7 of the light way is completely covered in the ultraviolet-rays interception case 50 according to this example of an embodiment It completely disappears from the surroundings that ultraviolet rays enter in the ultraviolet-rays interception case 50. Even if each UV resin covering cable core of the receptacle side optical fiber 10, the optical fiber coupler module 18, and the light way of the optical cable 33 is wired in the state of exposure in the ultraviolet-rays interception case 50 Become possible for ultraviolet rays to be irradiated [stop / *****] by these exposure wiring parts, and to prevent perfectly the degradation phenomenon of UV resin enveloping layer by ultraviolet rays, and by this It becomes possible to maintain the reliability over the long period of time of the light way maintenance system using surveillance change equipment 7 and this surveillance change equipment 7.

[0021] this example of an embodiment -- each -- fiber change selection equipment A1 -An **** -- the optical

switch which performs a connection change with the master optical fiber 12, and 14 and the receptacle side optical fiber 10 is built in. This optical switch is the connection change method ([connection one end of the receptacle side optical fiber 10 is equipped with the connector, and]) of a connector. The master optical fiber 12 and connection one end of 14 are also equipped with the connector. Although the method which makes connector connection at the connector of the receptacle side optical fiber 10 moved and ordered the connector by the side of a master optical fiber may be used, in this example of an embodiment, the switch change mechanism of V slot method is adopted. drawing 2 -- each -- fiber change selection equipment A1 -An The example of 1 form of the fiber change connection method using V slot of the master optical fiber 12 which can be set, and the 14 and the receptacle side optical fiber 10 is shown. These receptacle side optical fiber 10 has a predetermined pitch interval (the example of drawing 2 ** pitch interval) on the upper surface of the fiber arrangement member (substrate) 25 with the optical fiber arrangement group by which accommodation fixation was carried out into the V slot 26 by which arrangement formation was carried out. The master optical fiber 12 and 14 are prepared in the side which counters this optical fiber arrangement group.

[0022] Fixed wearing of this master optical fiber is carried out on the move stage 27, and the tip side of a master optical fiber is elongated by them from the move stage 27. By the drive mechanism by which the move stage 27 is not illustrated, movement of the direction (transverse direction) of X of three dimensions, the direction (lengthwise direction) of Y, and the direction (the attitude direction which meets in the direction of an optic axis of a master optical fiber) of Z is controlled by the control part 44.

[0023] Moreover, the fiber control implement 28 which stuffs the tip side of a master optical fiber into the V slot 26, and holds it is formed in the move stage 27. This fiber control implement 28 uses the rotation axis 30 as a fulcrum, and The counterclockwise rotation of the direction of fiber control, Right reverse rotation with the clockwise rotation of the fiber control release direction is attained, this right reverse rotation is performed by the actuator which is not illustrated, and operation of this actuator is also controlled by the control part 44.

[0024] [the optical switch (fiber change mechanism) of this example of an embodiment] If ordered in the number of the receptacle side optical fiber 10 of instructions of a light way to measure from the test control part 1 side, i.e., the connection partner of a master optical fiber Sending movement of the move stage 27 is controlled by the control part 44, and a master optical fiber is sent and moved to the same V Mizogami as the receptacle side optical fiber 10 of the ordered number. [in this state, rotate the fiber control implement 28 in the direction of fiber control, and / the tip side of a master optical fiber / the V slot 26 / carrying out accommodation maintenance] Alignment with a connection partner's receptacle side optical fiber 10 and a master optical fiber is performed, and connection with the receptacle side optical fiber and master optical fiber which were ordered is attained.

[0025] Thus, whenever it is ordered in the cable core number of a connection partner's receptacle side optical fiber 10 Sending movement of a master optical fiber is performed, a connection change with a master optical fiber and the receptacle side optical fiber 10 is performed one by one, and measurement of the injury check appearance of each light way which used the measuring instrument of the OTDR4 grade after the self-check of a light way maintenance system and the end of this self-check is performed.

[0026] This invention is not limited to the above-mentioned example of an embodiment, and can take the form of various operations. For example, although the above-mentioned example of an embodiment explained for the surveillance change equipment 7 used for a light way maintenance system as shown in drawing 4 The surveillance change equipment of this invention is applied to the surveillance change equipment of the light way maintenance system of other various forms other than the light way maintenance system shown in drawing 4 , and can be applied as surveillance change equipment of a light way maintenance system as shown in drawing 3 .

[0027] The systems shown in this drawing 3 are fiber change selection equipment E1 and E2. It is that in which the fiber change selection equipment of two or more pairs is formed as one pair. Each fiber change selection equipment E1 and E2 The test control part 1 is connected by one the master optical fiber 12 and the optical cable of 14. Fiber change selection equipment E1 The optical switch change for exclusive use by the side of the input side optical fiber 20 of optical fiber coupler module 18' which functions as a monitor side optical fiber is performed. Fiber change selection equipment E2 It has composition which similarly performs the optical switch change for exclusive use by the side of the output side optical fiber 22 of optical fiber coupler module 18'. Also in this system, the surveillance change equipment 7 of a light way is covered in the ultraviolet-rays interception case 50.

[0028] Moreover, [a light way maintenance system] for not preparing the optical fiber coupler 18 and 18' as shown in drawing 5 The optical fiber of UV resin covering cable core of the monitor side optical fiber directly connected to the light way of each heart of the optical cable of a member system is collected to a connector 42. It is possible for there to be also a thing of the type connected with the receptacle side optical fiber 10 by a connector 16 and connector combination of 42, and to apply as such an optical fiber coupler module 18 and surveillance change equipment 7 of the light way of the light way maintenance system of a type in which 18' is not prepared. Also in this case, surveillance change equipment 7 will be covered in the ultraviolet-rays interception case 50.

[0029]

[Effect of the Invention] Since this invention has covered the exposure wiring field of UV resin covering cable core including fiber change selection equipment, the monitor side optical fiber, and a light way in the case for ultraviolet-rays interception [the ultraviolet rays which try to enter in a case from the exterior] even if it will be prevented perfectly and exposure wiring of the UV resin covering cable core is carried out by this in the case for ultraviolet-rays interception Since UV resin covering cable core is interrupted by the case and does not receive irradiation of ultraviolet rays, it is completely lost that degradation arises by ultraviolet rays, and thereby, degradation of UV resin covering cable core by ultraviolet rays can be prevented certainly, and it becomes possible to secure the reliability over the long period of time to ultraviolet rays.

[0030] Moreover, since the bad influence by ultraviolet rays is lost in any way even if it uses UV resin covering cable core like the above Since UV resin covering cable core with high manufacture efficiency can be used as an optical fiber covering cable core convenient, it becomes possible to attain reduction-ization of a part and equipment cost which can make inexpensive the manufacture unit price of an optical fiber cable core.

[Brief Description of the Drawings]

[Drawing 1] It is the composition explanatory view of the example of 1 embodiment of the surveillance change equipment of the light way concerning this invention.

[Drawing 2] It is the explanatory view of the optical switch mechanism adopted in this example of an embodiment.

[Drawing 3] It is the explanatory view showing the example of 1 form of the light way maintenance system by which the surveillance change equipment of this example of an embodiment is incorporated.

[Drawing 4] It is the explanatory view of the common light way maintenance system by which the surveillance change equipment of the light way of this example of an embodiment is incorporated.

[Drawing 5] It is the explanatory view of the light way maintenance system which omitted the optical fiber coupler module into which the surveillance change equipment of the light way of this example of an embodiment is built.

[Drawing 6] It is the explanatory view showing the surveillance change equipment of the conventional light way.

[Explanations of letters or numerals]

7 Surveillance Change Equipment of Light Way

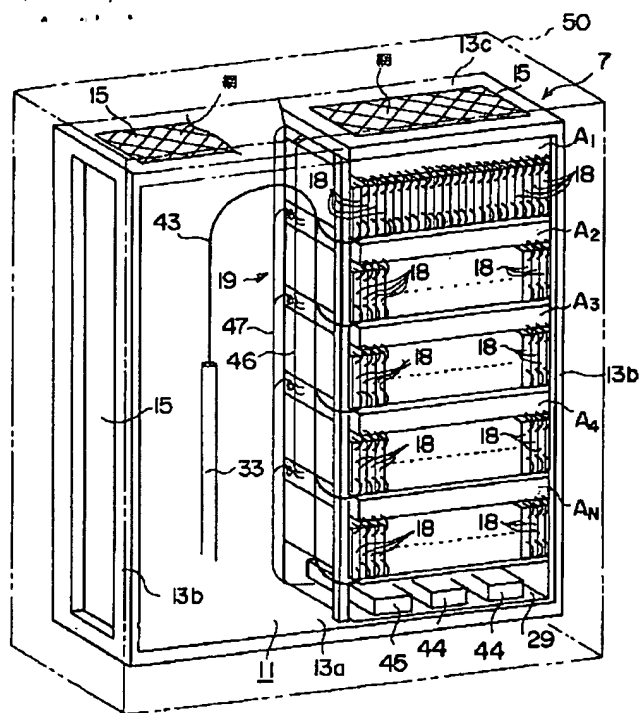
10 The Receptacle Side Optical Fiber

18 18' Optical fiber coupler module

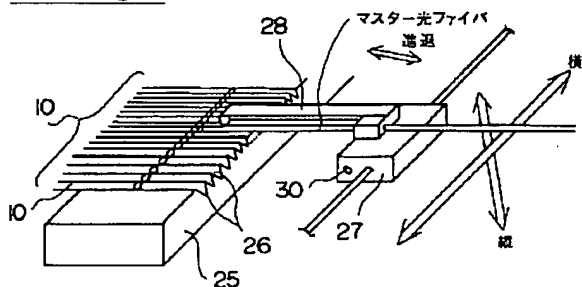
50 Ultraviolet-Rays Interception Case

A1 -An, E1, and E2 Fiber change selection equipment

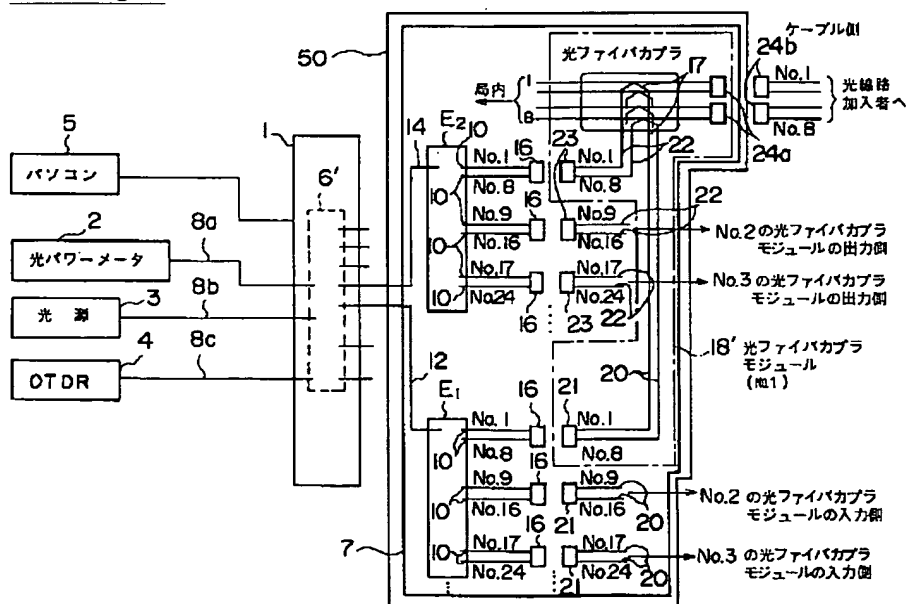
[Drawing 1]



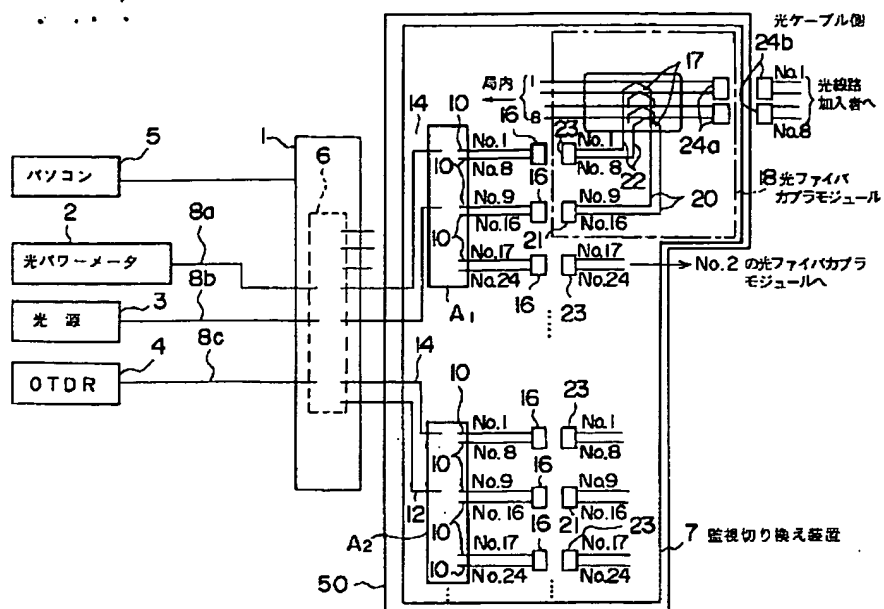
[Drawing 2]



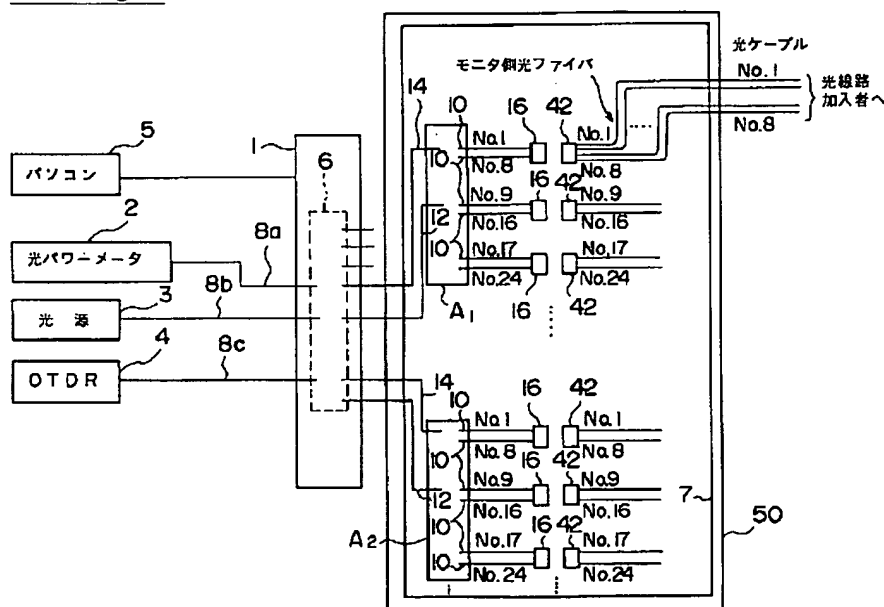
[Drawing 3]



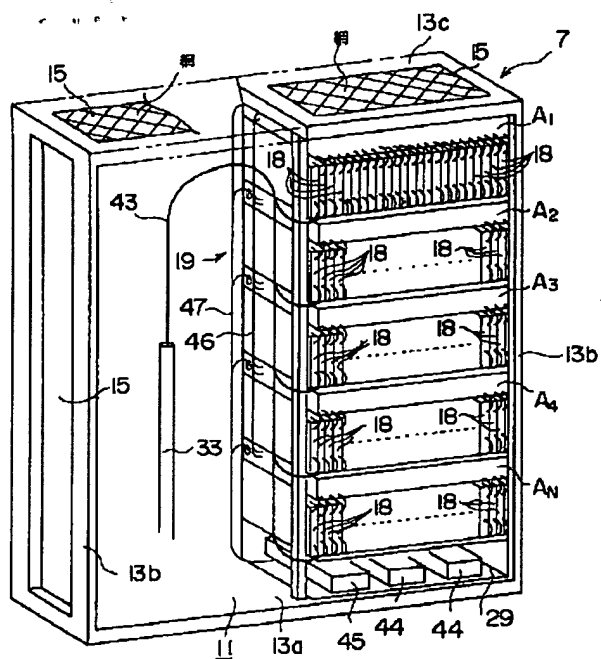
[Drawing 4]



[Drawing 5]



[Drawing 6]



[Translation done.]

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☒ **BLACK BORDERS**
- ☒ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☒ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☒ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☒ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.